MISSOURI DEPARTMENT OF NATURAL RESOURCES

2022 Progress Update

Missouri Nutrient Loss Reduction Strategy

The Missouri Nutrient Loss Reduction Strategy (NLRS) is a collection of adaptive approaches to reduce nutrient pollution from point and nonpoint sources. The overarching goal of the NLRS is to improve local water quality and reduce statewide nutrient pollution that ends up in the Mississippi River and Gulf of Mexico.

PRIORITY PROGRESS

Priorities Promised in 2020-2021

In continuing to **Implement Numeric Nutrient Criteria for Lakes** in 2020 and 2021, the Missouri Department of Natural Resources conducted 19 watershed models, 43 antidegradation reviews, and identified lakes on the 2020 303(d) list as impaired due to nutrients or chlorophyll-a.

4R Nutrient Stewardship: To date, the department's Soil and Water Conservation Program (SWCP) has entered into a total of 5 contracts with 2 separate cooperators in Randolph County with the potential to reduce nutrients from 552 acres.

Implement Statewide Soil Moisture Network: The department successfully installed soil moisture and temperature sensors at 15 sites across Missouri that will help understand and respond to weather conditions affecting nutrient infiltration and runoff.

NLRS Accomplishments of 2020 & 2021

- Thanks to the Missouri Parks, Soils, and Water Sales Tax (1/10th of 1%), over $66 million in tax revenue went directly to fund agricultural conservation practices on the ground.
- The department estimates that cost-share projects funded by the SWCP in 2020 and 2021 will prevent 2,566,653 tons of soil and their associated nutrients and pesticides from leaving Missouri farm fields.
- The department estimates reductions of >265,000 pounds of total nitrogen and >60,000 pounds of total phosphorous could be achieved by conservation practices funded in watersheds targeted by the department's Section 319 Nonpoint Source Program.
- Thanks to an EPA Hypoxia Task Force grant, the department commissioned a study to quantify the total nutrient reductions from state investments in agricultural best management practices (BMPs) in two pilot watersheds.
- Waste water regionalization and consolidation efforts resulted in twenty-one point source outfall removals. Eleven outfalls were located in total maximum daily load (TMDL) regulated watersheds, and six outfalls were located in watersheds containing 2020 303(d) listed waterbodies listed for nutrients and chlorophyll-a.
- Missouri Fertilizer Control Board (MoFCB) assisted with the creation of the 4R Nutrient Management pilot cost-share program in partnership with Missouri Soil and Water Conservation Districts. 4R Nutrient Stewardship promotes using the right fertilizer source, at the right rate, at the right time, and in the right place.

(continued)

527,424 Acres In Cover Crops Funded 2020-2021

300,643
State cost-share program

+

226,781
Environmental Quality Incentives Program (EQIP)

=

An area the size of...

2,453
State Fair Grounds

140
Ha Ha Tonka State Parks

9.7
Lakes of the Ozarks

- MoFCB provided funding to create a Missouri 4R Handbook for Forages and a Missouri 4R Handbook for Row Crops.
- MoFCB also provided support to the MU Certified Strip Trial Program, National Corn Grower's Soil Health Partnership Program, and Missouri Farmers Care's Ag Ed in the Classroom Program – specifically the soils and conservation unit.
- MoFCB continued previously funded research projects:
    - Testing fertilizer spreaders - putting fertilizer in the right place
    - Evaluation of urease and nitrification inhibitors in tall fescue
- MoFCB developed an education/outreach program to provide information on nutrient stewardship in Missouri – Show-Me Nutrient Stewardship. This program does not require a commitment of time or money, but instead asks partners to encourage their customers to utilize 4R nutrient stewardship practices. Producer partners are encouraged to put additional 4R practices to work in their farming operations and share with other producers about the benefits of 4R nutrient stewardship practices.
- More details on how Missouri is implementing its NLRS can be found in the Hypoxia Task Force 2019-2021 Report to Congress: epa.gov/ms-htf/hypoxia-task-force-reports-congress

Project Highlight: The Agriculture Edge of Field Monitoring Program

The Agriculture Edge of Field Monitoring Program is a farmer driven collaborative program designed to measure the effectiveness of farmer conservation practices, demonstrate the benefits of voluntary agricultural conservation and support water quality efforts aimed at meeting state soil and water stewardship goals.

In order to understand the extent to which soil and water conservation practices have an impact on water quality, 7 farms located in Missouri, representing typical Missouri row crop farming practices, were identified and selected for implementation of an edge-of-field monitoring study. As part of this study, a field approach is being utilized, comparing two similar fields/plots at each of the 7 locations: one containing an identified BMP and the other employing conventional methods. To accomplish this, the program collects reliable water quality data and information at real working farms operating under different management practices and within different agricultural landscapes. As of December 2022, the project has been collecting data for 5 years at most sites.

The objectives of this program are:

- Collecting reliable water quality information on real working privately owned and operated farms
- Improving communication among farmers, industry, governmental partners and policy makers about the environmental performance and effectiveness of conservation practices
- Taking a proactive approach and supporting voluntary based water resources management and improvement
- Providing farmers with useful information they can use to seek the best solutions that work within their farming operation
- Demonstrating long-term improvements in water quality and soil conservation, when possible, in areas where certain BMPs might be adopted

Partners: Missouri Corn Merchandising Council, Missouri Soybean Merchandising Council, Missouri Department of Natural Resources, USDA-Natural Resources Conservation Service, Missouri Fertilizer Control Board

Conclusions from the study:

- Heavy rain events that occur only a few days a year can account for a high percentage of runoff in a cropping year.
- Cover Crops are effective at reducing runoff of nutrients and increasing water holding capacity during winter months.
- Implementing multiple conservation best management practices on the landscape is the best approach to reducing nutrient loss to precipitation events. (Example: Grassed Waterways, Nutrient Management and Cover Crops simultaneously)
- Research on real working privately owned and operated farms provides everyday scenarios of a working farm and serves as a demonstration to other farmers.
- Data analysis from this monitoring program will also help inform numerical simulation(s) and water quality models, to support BMP recommendations as well as to document expected reduction/water quality improvement of existing BMPs.

Priorities for 2022 & 2023

1. The department will finalize and publish Missouri's Nutrient Trading Program, to be implemented through individual wastewater permits throughout upcoming years. This is a market-based compliance option for permitted point sources aimed at creating a flexible compliance approach and spurring participation in nonpoint source nutrient reduction practices.

2. SWCP will designate five Targeted Watersheds: Blackwater, Cahokia-Joachim, South Fork Salt, Little Osage, and Thompson. This project aims to identify areas within a watershed where agricultural best management practices can achieve the most economically efficient reductions of sediment and nutrients into waterways.

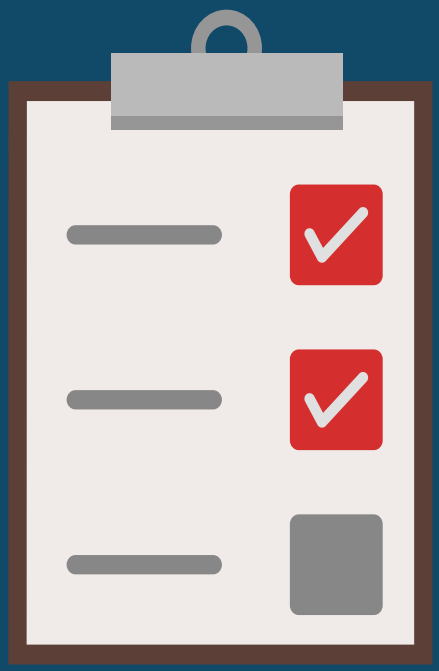
3. SWCP will also begin work in the Mozingo Lake watershed. This project plans to reduce nutrient and sediment loading through targeted conservation. Sediment and nutrient runoff have contributed to algal blooms impacting the taste and odor of drinking water sourced from the lake.

4. The department will develop model-based historical nutrient baselines for both total nitrogen and total phosphorus. This will help in defining progress towards statewide nutrient reduction goals. These goals include an interim target of 20 percent reduction by 2025 and a final target of 45 percent reduction by 2035, relative to the 1980–1996 HTF baseline period.

5. The department plans to finalize the Total Phosphorous Reduction Target Rule. This is not a water quality or technology based rule. However, it does establish effluent limits for point sources. Facilities will be able to comply by meeting target phosphorus concentrations of 1.0 mg/L, a mass-based equivalent of 1.0mg/L at design flow, a 75% reduction from influent to effluent, or a 75% reduction from effluent to effluent.

6. NRCS will expand the Mississippi River Bain Healthy Watershed Initiative and the National Water Quality Initiative targeted funding to additional impaired watersheds.

7. Nutrient Management Initiative-Inflation Reduction Act funds received by NRCS will focus on Climate Smart Agriculture, including nutrient management.



$2 million in grant funding provided by the EPA will fund additional NLRS projects through 2024.

Initial projects include:

Missouri Nutrient Reduction Progress Tracking Dashboard

The dashboard will be a public, web-based data display for tracking and publicizing nutrient reduction data and metrics for progress.

Expansion of Missouri's Ambient Nutrient Monitoring

The department plans to add continuous nitrate and flow monitors to four existing United States Geological Survey water quality monitoring stations.

Missouri Municipal Wastewater Nutrient Optimization Pilot

This project will fund a pilot study of municipal wastewater facilities to optimize operational and maintenance practices and reduce nutrient loads without requiring large capital expenses.

Gulf Hypoxia Outreach and Education Exhibit

This project will be a partnership with St. Louis Science Center to develop a public education exhibit which raises awareness of nutrient pollution in the Mississippi River Basin, the Midwest's role in Gulf of Mexico Hypoxia, and actions the public can take to help reduce their personal nutrient footprint.

Refining Nutrient Reduction Models with Subsurface Nutrient Transport Measurement

The SWCP plans to partner with Lincoln University, a Land Grant University and Historically Black University, to perform a study aimed at further refining nutrient loss reduction estimates for common agricultural best management practices.

For More Information:

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